

REMARKS

Claims 1 - 30 were pending in the present application for patent as of the Office Action of November 26, 2004. In the Office Action of November 26, 2004, the Examiner rejected claims 26 and 27 under 35 U.S.C. 102(a or e) as being anticipated by U.S. Publication Number 2003/0139011, Cleeves et al., maintained the previous rejection of claims 26 and 28 under 35 U.S.C. 102(e) as being anticipated by U.S. Publication Number 2004/0041189, Voshell et al., maintained the rejection of claims 1 - 12, 14 - 15, 17 - 20, and 22 - 25 under 35 U.S.C. 103(a) as being unpatentable over Voshell et al. in view of U.S. Patent Number 6,649,476, Forbes and U.S. Publication Number 2001/0024858, Schulz et al., rejected claims 13 and 21 under 35 U.S.C. 103(a) as being unpatentable over Voshell et al. in view of Forbes and Schulz et al. as applied to claims 1 - 12, 14 - 15, 17 - 20, and 22 - 25 and further in view of U. S. Publication Number 2004/0041188, Bissey, maintained the rejection of claim 16 under 35 U.S.C. 103(a) as being unpatentable over Voshell et al. in view of Forbes and Schulz et al. as applied to claims 1 - 12, 14 - 15, 17 - 20, and 22 - 25 and further in view of U.S. Patent Number 6,511,884, Quek et al., rejected claim 27 under 35 U.S.C. 103 as being unpatentable over Voshell et al. as applied to claims 26 and 28 above, and further in view of Bissey, rejected claim 28 under 35 U.S.C. 103(a) as being unpatentable over Cleeves et al. as applied to claims 26 and 27 and further in view of Bissey, rejected claims 29 and 30 under 35 U.S.C. 103(a) as being unpatentable over Cleeves et al. as applied to claims 26 and 27 and further in view of Forbes et al, and rejected claims 29 and 30 under 35 U.S.C. 103 as being unpatentable over Voshell et al. as applied to claims 26 and 28 above, and further in view of Forbes. The office action was made final.

The applicants believe that the claims, as previously presented, are allowable over the references previously cited by the examiner for at the reasons given in the amendment faxed on September 10, 2004. In this respect, the remarks presented below are additive to the remarks provided in the amendment of September 10, 2004.

Claims 26 and 27 were rejected under 35 U.S.C. 102(a or e) as being anticipated by U.S. Publication Number 2003/0139011, Cleeves et al. Cleeves et al. discloses a multigate semiconductor device that is formed such that a current flows through the device in a direction perpendicular to the substrate (see e. g. paragraph 0006). Cleeves et al. does not show or suggest a method of forming a semiconductor substrate as claimed in amended claim 26, now twice amended, where the source region, drain region, and the channel region are formed

parallel to the substrate. Cleeves et al. only shows the source region, drain region, and the channel region formed perpendicular to the substrate. Therefore, the applicants believe that claim 26 is allowable over Cleeves et al.

Regarding the rejection of claim 27, the applicants believe that the above comments regarding the rejection of amended claim 26 apply, and that claim 27 is allowable over Cleeves et al.

The previous rejection of claims 26 and 28 under 35 U.S.C. 102(e) as being anticipated by Voshell et al. was maintained. Voshell et al. discloses a vertically oriented access transistor for a memory where the channel region is formed vertically relative to the substrate. Claim 26, as amended, claims that the source region, drain region and the channel region are formed in a plane parallel to the substrate. Therefore, the applicants believe that currently amended claim 26 is allowable over Voshell et al. Also, claim 28 is allowable over Voshell et al. at least for the reasons given above for amended claim 26.

The examiner maintained the rejection of claims 1 - 12, 14 - 15, 17 - 20, and 22 - 25 under 35 U.S.C. 103(a) as being unpatentable over Voshell et al. in view of Forbes and Schulz et al. The applicants have amended claims 1 and 17, now twice amended. Voshell et al. in view of Forbes and Schulz et al. does not show or suggest the present invention as claimed in amended claims 1 and 17. As discussed above, Voshell et al. does not show or suggest a source region, drain region, and channel region formed parallel to the substrate. The examiner depended on Forbes to show a polysilicon 216 formed over a "silicon pillar 204". However, the applicants believe that the reference in Forbes to "the silicon pillar 204", at column 7, lines 23 and 24 is a typographical error. Forbes states elsewhere that the pillar is formed from oxide. See for example, column 7, line 22, where pillars 204 are referred to as "respective oxide pillars 204". Also, column 7, lines 7 - 10 state that the pillars 204 are formed by etching oxide formed on the substrate 202. Therefore, the applicants believe that Forbes does not show a semiconductor structure as claimed in amended claims 1 and 17. Also, in Forbes the vertical transistors only have one gate (see column 7, lines 26 - 30). Also, in Forbes the gate is formed in a trench beside the pillar (column 7, lines 50 - 55). The examiner depends on Schulz et al. to show a silicon nitride film formed on the first and second vertical gate electrodes. However, as can be seen from the above, combining Voshell et al., Forbes, and Schulz et al. does not result in the present invention as claimed in amended claim 1, where the source region, drain region and the channel region are formed in a plane parallel to the substrate.

Regarding the rejection of claims 2 - 12, 14 - 15, 18 - 20, and 22 - 25, the applicants believe that the comments above concerning the rejection of claims 1 and 17 also apply to the rejection of claims 2 - 12, 14 - 15, 18 - 20, and 22 - 25, and that claims 2 - 12, 14 - 15, 18 - 20, and 22 - 25 are allowable over Voshell et al. in view of Forbes and Schulz et al.

Claims 13 and 21 were rejected under 35 U.S.C. 103(a) as being unpatentable over Voshell et al. in view of Forbes and Schulz et al. as applied to claims 1 - 12, 14 - 15, 17 - 20, and 22 - 25 and further in view of Bissey

The comments above concerning claims 1 and 17 also apply to the rejection of claims 13 and 21. The applicants believe that claims 13 and 21 are allowable over Voshell et al. in view of Forbes and Schulz et al. as applied to claims 1 - 12, 14 - 15, 17 - 20, and 22 - 25 and further in view of Bissey et al. for at least the reasons given above for claims 1 and 17.

The previous rejection of claim 16 under 35 U.S.C. 103(a) as being unpatentable over Voshell et al. in view of Forbes and Schulz et al. as applied to claims 1 - 12, 14 - 15, 17 - 20, and 22 - 25 and further in view of Quek et al. was maintained by the examiner. The applicants believe that claim 16 is allowable for at least the reasons given above for claims 1 and 17.

Claim 27 was rejected under 35 U.S.C. 103 as being unpatentable over Voshell et al. as applied to claims 26 and 28 above, and further in view of Bissey.

Claim 27 was rejected under 35 U.S.C. 103(a) as being unpatentable over Voshell et al. as applied to claims 26 and 28 and further in view of Bissey. Claim 28 was rejected under 35 U.S.C. 103(a) as being unpatentable over Cleaves et al. as applied to claims 26 and 27 and further in view of Bissey. Claims 29 and 30 were rejected under 35 U.S.C. 103(a) as being unpatentable over Cleaves et al. as applied to claims 26 and 27 and further in view of Forbes et al. Claims 29 and 30 were rejected under 35 U.S.C. 103 as being unpatentable over Voshell et al. as applied to claims 26 and 28 above, and further in view of Forbes. The applicants believe that the comments above regarding the rejection of claim 26 also applies to the rejection of claims 27 - 30, and that claims 27 - 30 are allowable over the cited references.


No amendment made was related to the statutory requirements of patentability unless expressly stated herein. No amendment made was for the purpose of narrowing the scope of any claim, unless the applicants have argued herein that such amendment was made to distinguish over a particular reference or combination of references.

Believing to have responded to each and every rejection contained in the Office Action mailed November 26, 2004, the applicants respectfully request the reconsideration and allowance of claims 1 - 30; thereby placing the application in condition for allowance.

Respectfully submitted,

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